Wisconsin Pharmacal Co., LLC – Potable Aqua™

www.pharmacalway.com

Device Information

Potable Aqua emergency drinking water germicidal tablets contain iodine. The manufacturer markets two products with Potable Aqua, one product consists of iodine tablets only; the other consists of iodine tablets and neutralizing tablets (ascorbic acid) that remove iodine taste, odor, and color. The manufacturer, Wisconsin Pharmacal, also produces Globaline for the U.S. Military, and Coghlan's Emergency Drinking Water Tablets™ for Coghlan's Ltd., which are identical to Potable Aqua. Fifty iodine tablets are packaged in a small bottle with a vinyl lined screw cap. The cap also has an adhesive seal that allows it to be reused to keep moisture from getting into the bottle. Directions for use require the addition of 2 tablets to 1 liter of water and cap loosely to allow a small amount of leakage. Wait 5 minutes. Shake the container to allow screw threads on the closure to be moistened then tighten cap. Wait 30 more minutes before drinking. If using neutralizing tablets, add 2 tablets to 1 liter only after the required wait time for the iodine tablets. Two iodine tablets result in a 16 mg/L iodine concentration in 1 liter. Potable Aqua is composed of tetraglycine hydroperiodide, sodium acid pyrophosphate and talc. The disinfection capabilities of iodine have long been recognized and it is widely used as an antiseptic and as an emergency drinking water disinfectant. The device should be stored in a cool dry place and tablets should be kept dry.

Effectiveness Against Microbial Pathogens

Independent testing using the U.S. Environmental Protection Agency (USEPA) Guide Standard and Protocol for Testing Microbiological Water Purifiers (reference 1) has been conducted with Globaline (references 2 and 3). Because Globaline and Potable Aqua are identical products, the results can be applied to Potable Aqua. Independent testing using the reference 1 protocol confirms Potable Aqua consistently provides a 6-log bacteria and 4-log virus reduction when used as directed. This testing also confirms that Potable Aqua does not consistently provide 3-log *Giardia* cyst and *Cryptosporidium* oocyst reduction when used as directed. Potable Aqua, when used according to directions, provides a 16 mg/L iodine dosage and a 35-minute contact time resulting in a disinfectant concentration times contact time (CT) of 560 mg-min/L.

™ Potable Aqua and Globaline are trademarks of Wisconsin Pharmacal Company, LLC, Jackson, WI.
™ Coghlan's Emergency Drinking Water Germicidal Tablets is a trademark of Coghlan's Ltd., Winnipeg, Canada. Use of a trademarked product does not imply endorsement by the U.S. Army, but is intended only in identification of a specific product

Potable Aqua can provide a 3-log *Giarida* cyst inactivation when treating most water quality conditions if contact time is increased beyond the directed 35 minutes. Independent testing data using reference 1 indicated contact times of at least 60 minutes (CT = 960 mg-min/L) achieved a 3-log *Giardia* cyst inactivation (reference 2). Other iodine disinfection studies recommend a CT of at least 720 mg-min/L for a 3-log *Giardia* cyst inactivation (reference 4). To ensure a 3-log *Giardia* cyst inactivation when using Potable Aqua, provide at least a 45-60-minute contact time. A 3-log *Cryptosporidium* oocyst inactivation is not realistically achievable when using Potable Aqua. Additional treatment is necessary to remove or inactivate *Cryptosporidium* oocysts. Based on independent data testing the device under severe conditions required by the USEPA protocol, Potable Aqua is given three √s for effectiveness against bacteria and viruses, and an X for effectiveness against *Giardia* cysts and *Cryptosporidium* oocysts (for an explanation of the rating checks click here). The following table summarizes Potable Aqua's expected performance, evaluation rating, and the mechanism by which the pathogens are reduced:

Table. Expected Performance Against Microbial Pathogens When Used As Directed.

Microbial Pathogen Type	Expected Performance	Evaluation Rating	Inactivation/removal Mechanism
Bacteria	> 6-log	√√√	disinfection
Viruses	> 4-log	√√√	disinfection
Giardia cysts	Not Effective*	X*	-
Cryptosporidium oocysts	Not Effective	X	-

* Recommend at least 45-60 minutes contact time to ensure 3-log *Giardia* cyst inactivation.

Production Rate and Capacity

One bottle of Potable Aqua iodine tablets treats 25 liters (2 tablets per 1 liter of water).

Cleaning, Replacement, End of Life Indicator, Shelf Life

The manufacturer recommends a shelf life of 1 year if the bottle has been opened. A shelf life of up to 4 years is recommended for an unopened bottle. In general, the potency of the tablets can be determined by their color. As the tablet deteriorates, the color changes. A fully effective tablet is steel gray. A 50% deteriorated tablet is white to yellowish brown, and a completely deteriorated tablet is deep brown.

Weight and Size

The weight of the Potable Aqua bottle is approximately 30 grams. The weight of the neutralizer bottle is approximately 30 grams. The approximate dimensions of each bottle are 5 cm x 2.5 cm.

Cost

Potable Aqua tablets alone cost approximately $5.00. Potable Aqua tablets and neutralizer tablets cost approximately $7.00.

Device Evaluation

Independent testing using the USEPA Guide Standard and Protocol for Testing Microbiological Water Purifiers (reference 1) has been conducted with Globaline (references 2 and 3). Because these are identical products, the results can be applied to Potable Aqua. Independent testing using the reference 1 protocol confirms Potable Aqua consistently provides a 6-log bacteria and 4-log virus reduction when used as directed. This testing also confirms that Potable Aqua™ does not consistently provide 3-log *Giardia* cyst and *Cryptosporidium* oocyst reduction when used as directed. Potable Aqua can provide a 3-log *Giarida* cyst inactivation when more than 60 minutes of wait time is provided. Potable Aqua tablets are not effective against *Cryptosporidium* oocysts. Additional treatment such as filtration with a 1 µm absolute filter to reduce *Cryptosporidium* oocysts is necessary. Potable Aqua is not expected to cause any adverse health effects when used by healthy adults with no pre-existing thyroid conditions or sensitivity to iodine. Potable Aqua is not recommended for use by pregnant women (concern for fetus), people with known hypersensitivity to iodine, people with a history (or family history) of thyroid disease, and people from areas with chronic iodine deficiency (reference 4). Iodine in Potable Aqua can cause a medicinal taste and color the water. The iodine can be neutralized by adding ascorbic acid (available with Potable Aqua) or sodium thiosulfate, which will improve the taste, odor, and color. Flavored drink mixes can mask the flavor. Neutralizers and flavor aids should not be added until after recommend contact times are achieved. Use of the Potable Aqua will not remove or reduce particulate matter.

Advantages

- Independent testing using the USEPA protocol confirms 6-log bacteria and 4-log virus reduction when used as directed.
- Very small and lightweight.
- Simple and inexpensive to use.
- No adverse health effects expected in healthy adults with no iodine sensitivity.

Disadvantages

- Not effective against *Cryptosporidium*. Additional treatment is necessary.
- Not consistently effective against *Giardia* cysts when used as directed. Recommend at least 45-60-minute contact time for adequate *Giardia* cyst reduction.
- Not recommended for use by pregnant women or people with iodine sensitivity.
- Does not reduce or remove particulate matter.
- Can impart color, medicinal taste, and odor.

References

1. U.S. Environmental Protection Agency, Registration Division Office of Pesticide Program, Criteria and Standards Division Office of Drinking Water. (1987). *Guide Standard and Protocol for Testing Microbiological Water Purifiers.* Washington, D.C.

2. U.S. Army Natick Research, Development, and Engineering Center. (1993). *Efficacy of Flocculating and Other Emergency Water Purification Tablets.* (NATICK/TR-93/033). Natick, MA. Prepared by Powers, E.M.

3. Gerba, C.P., Johnson, D.C., & Hasan, M.N. (1997). Efficacy of iodine water purification tablets against *Cryptosporidium* oocysts and *Giardia* cysts. *Wilderness and Environmental Medicine*, 8, 96-100.

4. U.S. Army Center for Health Promotion and Preventive Medicine. (2005). *Technical Information Paper; Iodine Disinfection in the Use of Individual Water Purification Devices,* Aberdeen Proving Ground, MD.